

# 2005 Annual NASA Occupational Health Conference

#### Hygiene Information System (HIS)

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# Original Mission

- Provide an electronic repository for information collected by Occupational Health Services
- Build interfaces to the data collected to allow Occupational Medicine physicians visibility to exposure data

#### What is HERS?

- HERS (Health and Environmental Resource System)
- Microsoft Access 97 based database
- Developed to meet the needs of Environmental Health at Kennedy Space Center

#### What is HIS?

- HIS (Hygiene Information System)
- A management information system created to integrate the existing databases into a tool to meet the current and future needs of Occupational Health Services
- Engineered from the ground up
- SQL Server 8.0
- Web Front End

# The Project Team

- Occupational Health
  - Sean Keprta, COTR, NASA
  - Denton Crotchett, CIH, Manager, Occupational Health
- Industrial Hygiene
  - David Rose, CIH, Supervisor, Industrial Hygiene
- Health Physics
  - Dennis Waggett, Radiation Safety Officer
- Environmental Health Laboratory
  - Dawn Fadner, EHL Manager
  - Robert Gillispie, Senior Chemist
- Information Technology
  - Kenneth Freeman, IT Supervisor
  - Gene Yen, Programmer
  - Edward Norris, IT Systems Developer, Comprehensive Health Services, Inc.

#### How Did We Get Here?

• Installation of the HERS (Health and Environmental Resource System) developed at Kennedy Space Center.

### Inherited Assumptions

- One size fits all All NASA centers operate the same way
- We can make a few modifications and it will work
- We should be all up in running in a few weeks

# **Expanding Requirements**

- Definition of the project
- Unsatisfied requirements
  - Task Tracker
    - Recurring Tasks
  - Sample Collection Process
    - Chain of Custody
  - Reporting Process
    - Quarterly Reports
    - Annual Reports

#### What Did We Do?

- Performed an inventory of functionality
  - Needed to know what was working and what was broken
- Implemented Data Administration standards
  - Naming conventions
    - Leszynski/Reddick Naming Conventions
    - Module Naming
    - Screen Numbers
    - Report Numbers
- Cleaned up the existing HERS and put into production
- Ceased modifications to the HERS system
- Gathered outstanding requests for enhancements
- Created an IT Steering Committee

# Analysis & Design

- Logical Data Modeling
  - Entity discovery, during the implementation of naming standards
  - Developed an understanding of the relationships
  - Validated against the Business Processes and Rules
  - Used Microsoft Visio Enterprise Architect to perform Data Analysis

# How Did We Build The System?

- Back-End SQL Server 8.0
- Front-End Web Based

#### Back-End

- Microsoft SQL Server 8.0
- Created an Enterprise (Corporate) database
  - Used to store data that is shared by other systems
- Created the HIS SQL database
  - Imported data from Access using Data Transformation Services
  - Added Audit fields
  - Created History tables and triggers

#### Front-End

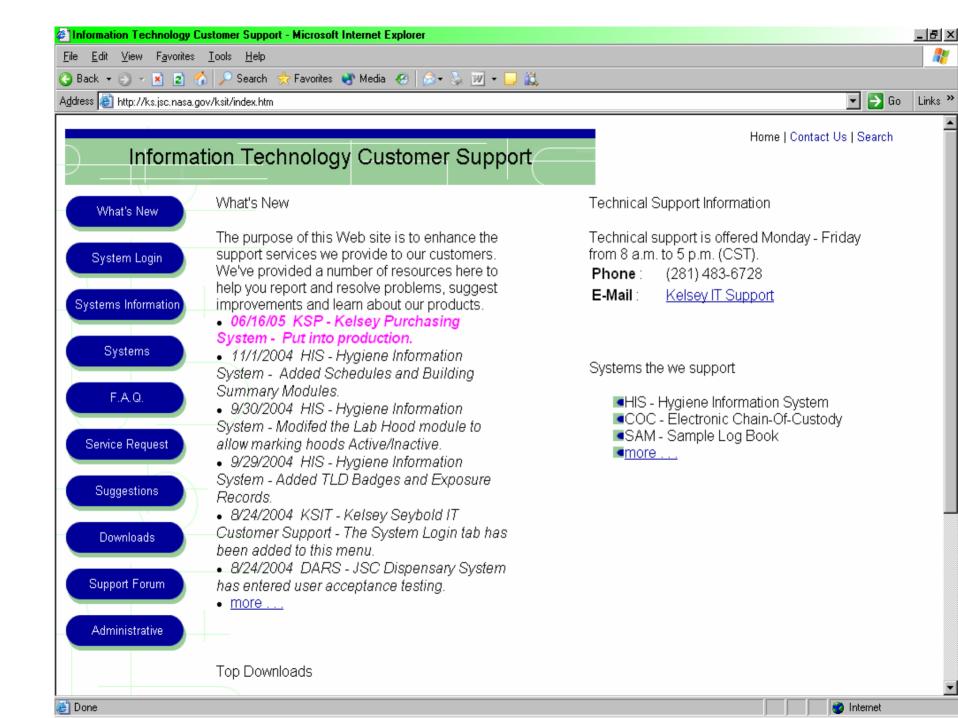
- Internet Explorer Based
  - Minimized training required, most users were already comfortable using Internet Explorer
  - Solved which version of Access was loaded on a workstation
  - Supported by standard workstation loads
  - Solved software component issues, such as different versions of dll's, ocx files.

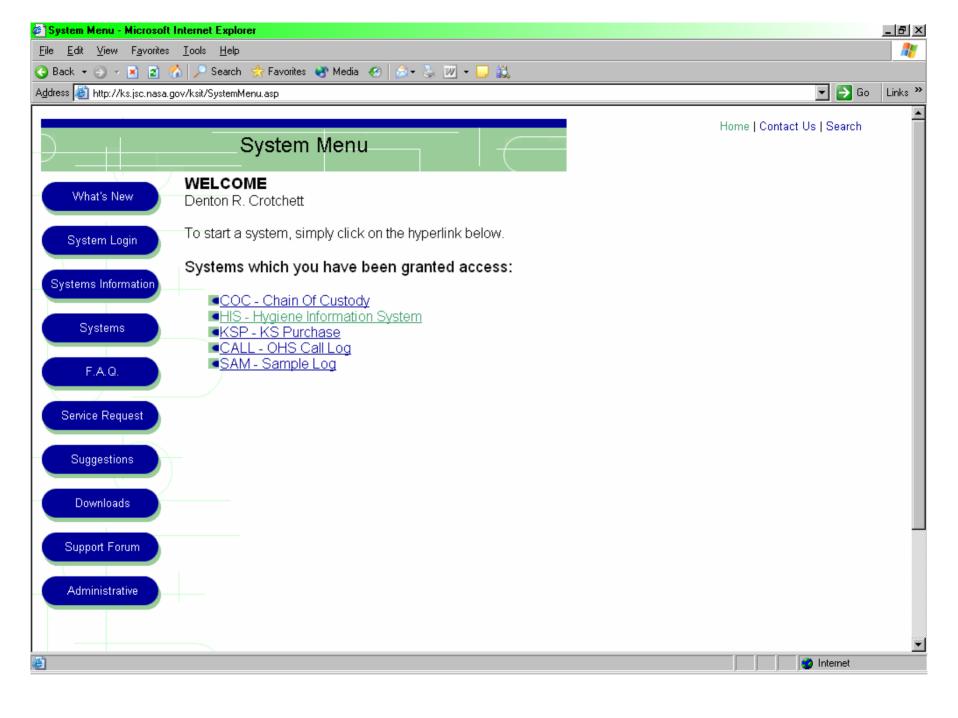
# Tools Used To Create The User Interface

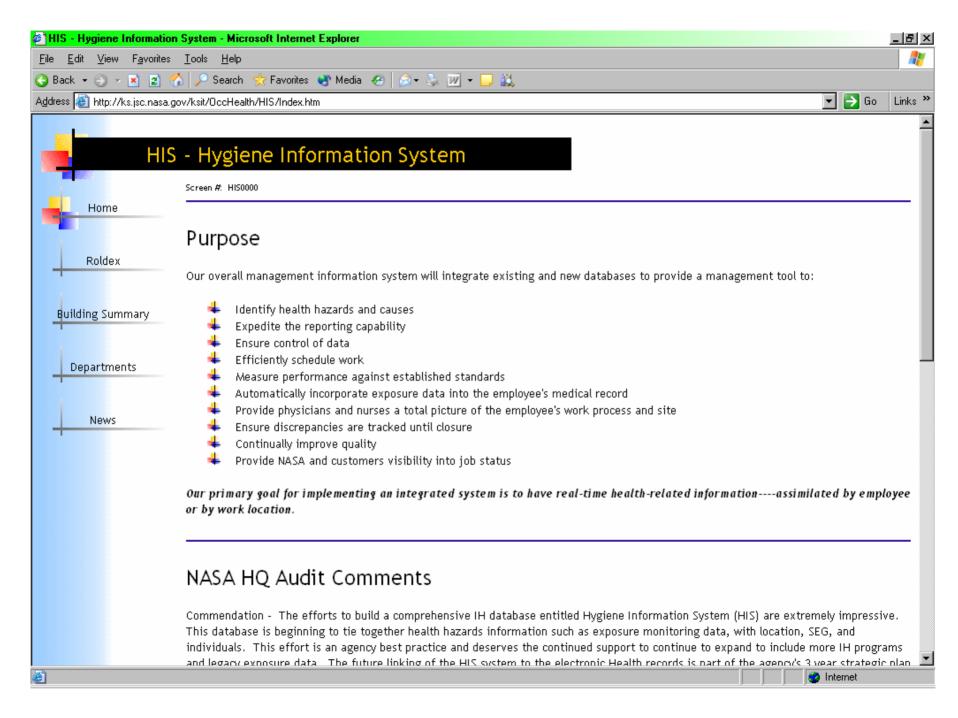
- Microsoft Front Page 2003
  - Created ASP (Active Server Pages)
  - HTML based
  - Code is written using VB (Visual Basic)
  - Very limited use of JAVA

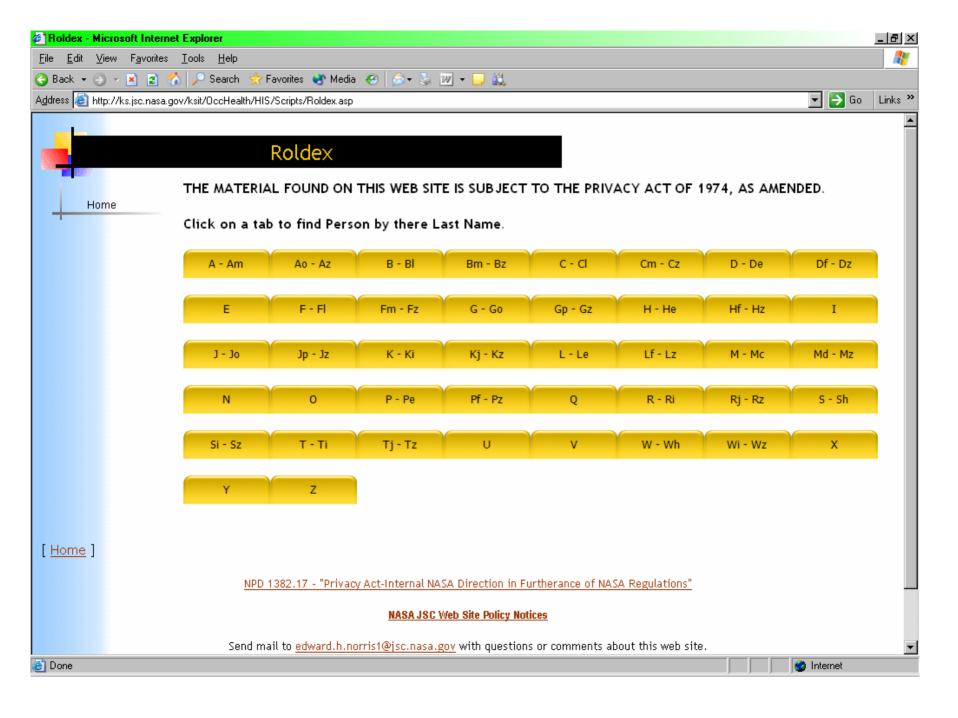
# Implementation

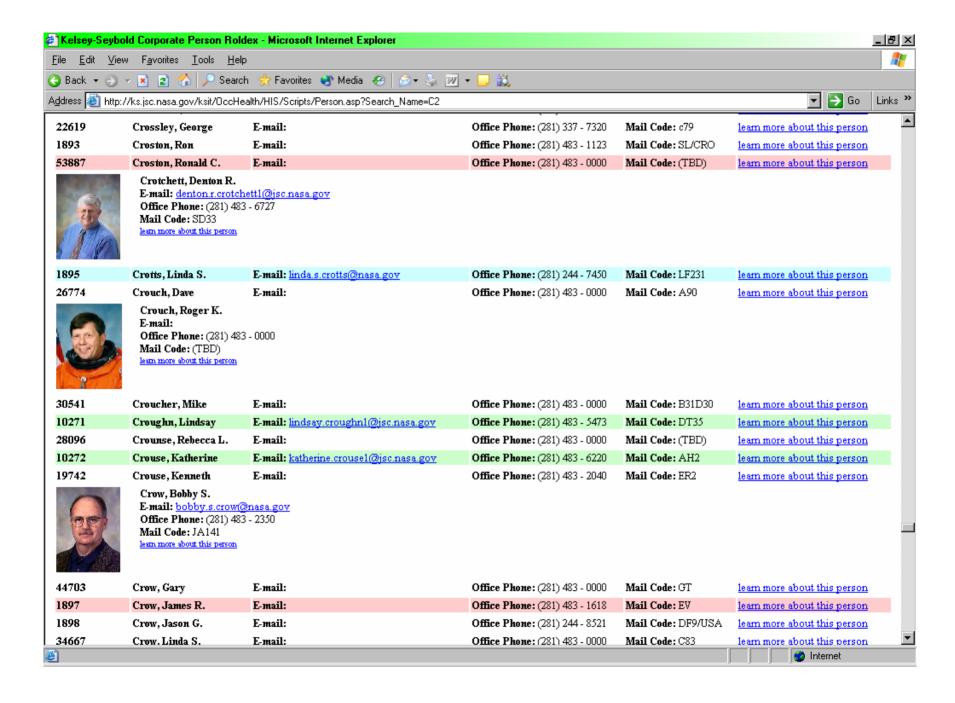
- Disparate Data Collections
  - IH records
  - Lab Records
  - Health Physics Records
- Retrospective Data Entry
  - Historical Asbestos Sampling Records
  - Entry of data collected in Word Documents
  - Excel Spreadsheets

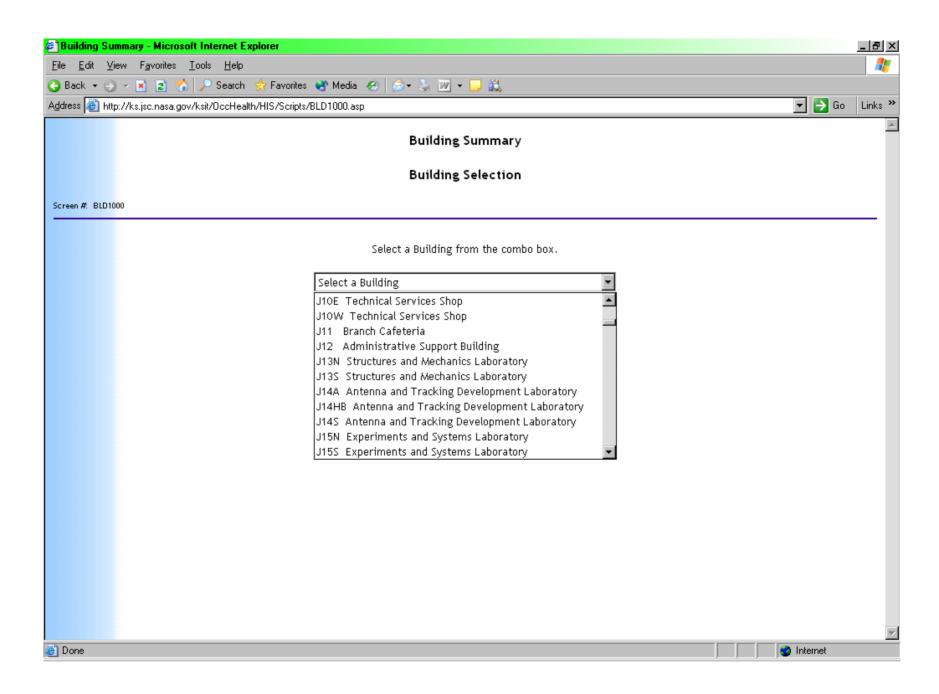


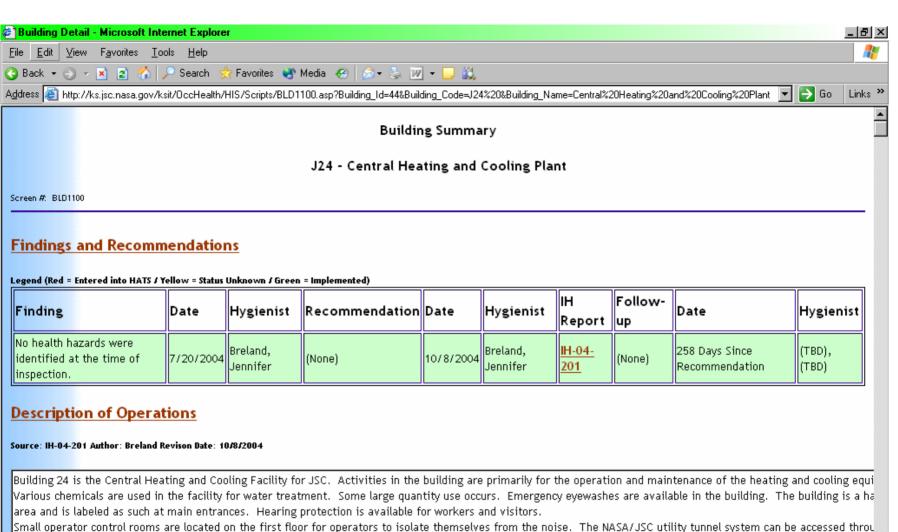












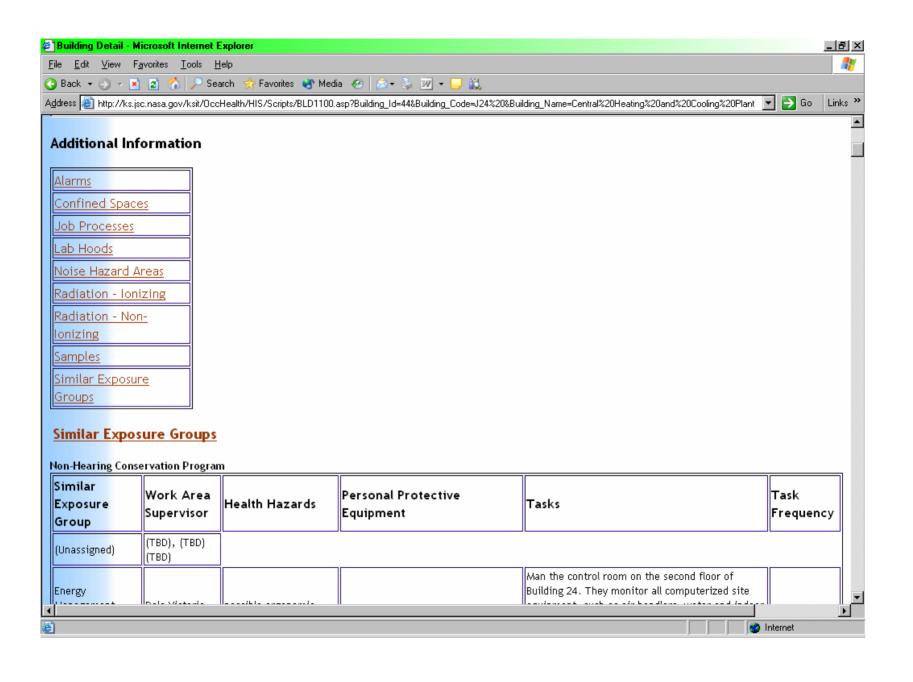
Small operator control rooms are located on the first floor for operators to isolate themselves from the noise. The NASA/JSC utility tunnel system can be accessed throu building.

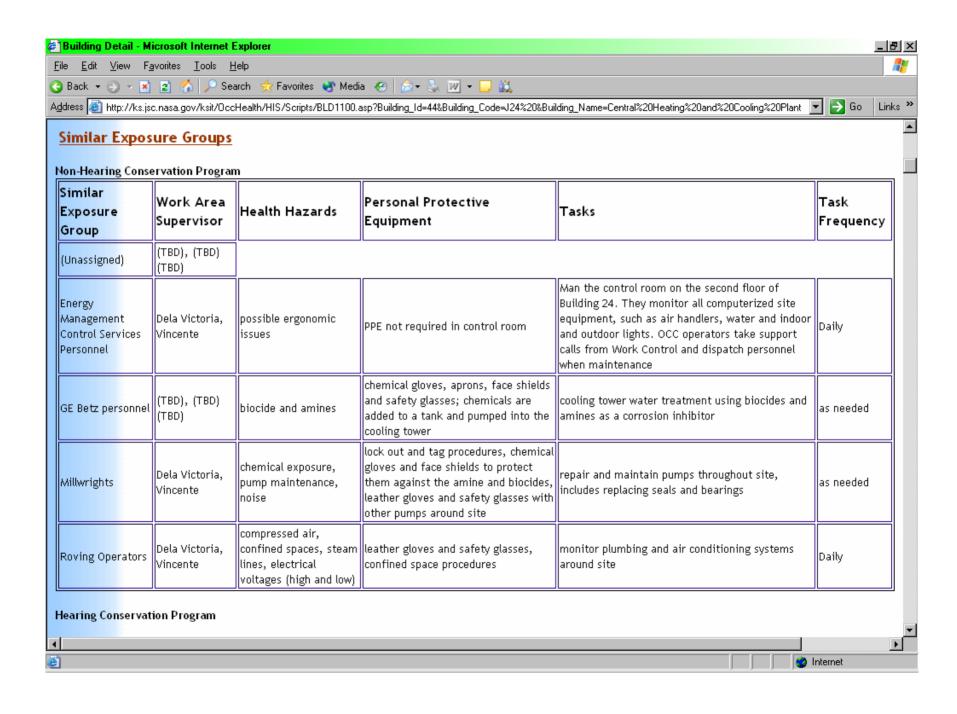
A small chemistry lab is located at the southeast corner of the building (Room 101). The lab has an exhaust ventilation hood that is current in flow testing and labeling. used by DynCorp/Lynx personnel to mix chemicals for the water testing. An eyewash station is attached to the sink in the laboratory.

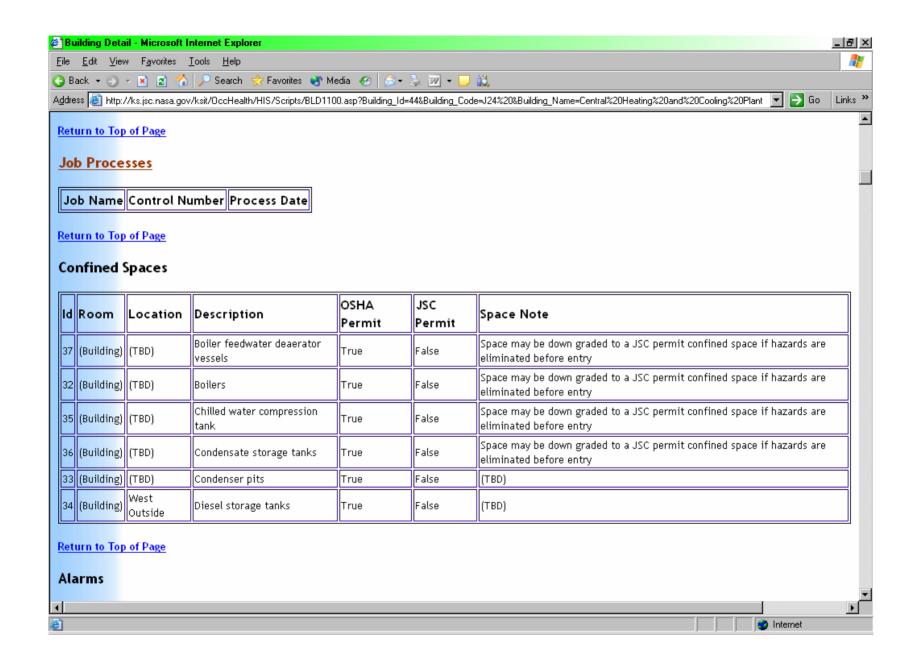
Internet

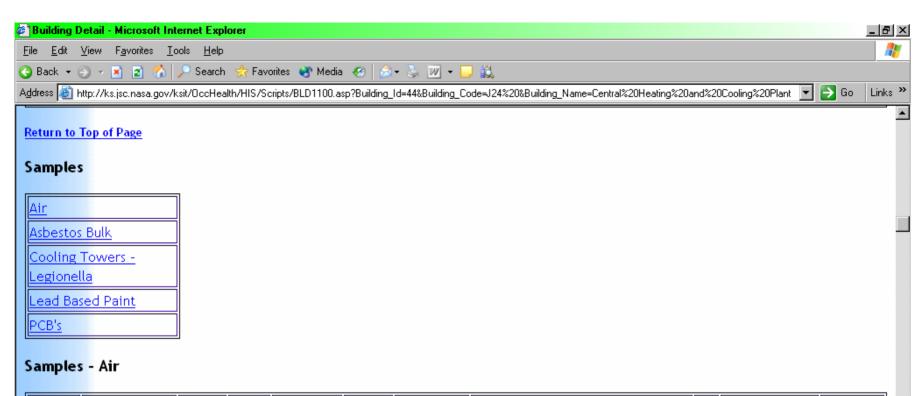
A small machine shop area is located at the north end of the building and contains a drill press, a grinder and oxy/acetylene welding equipment.





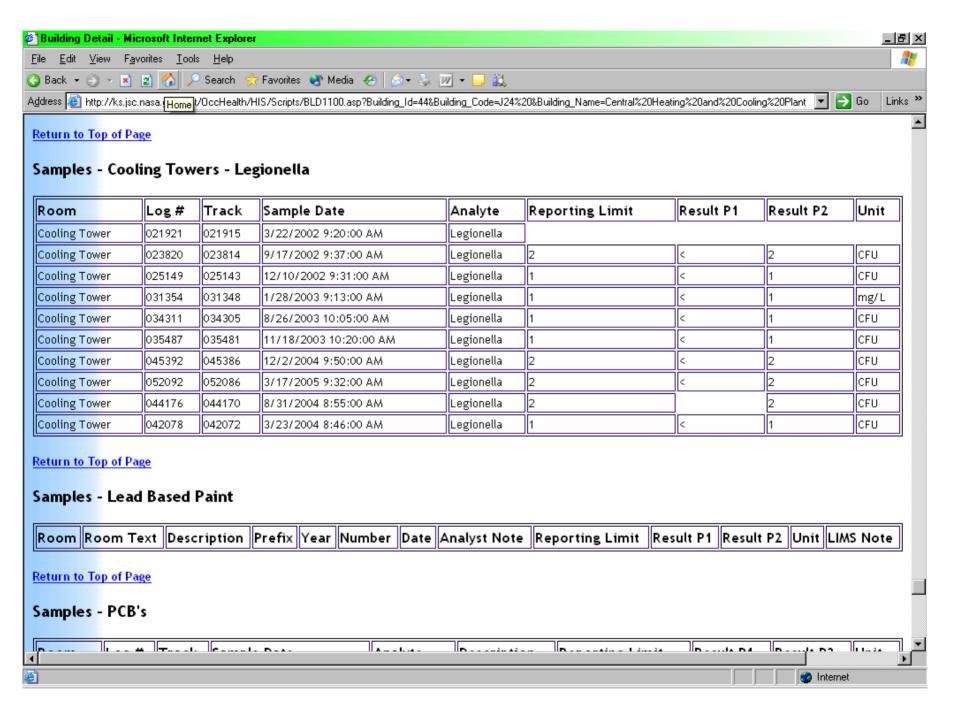


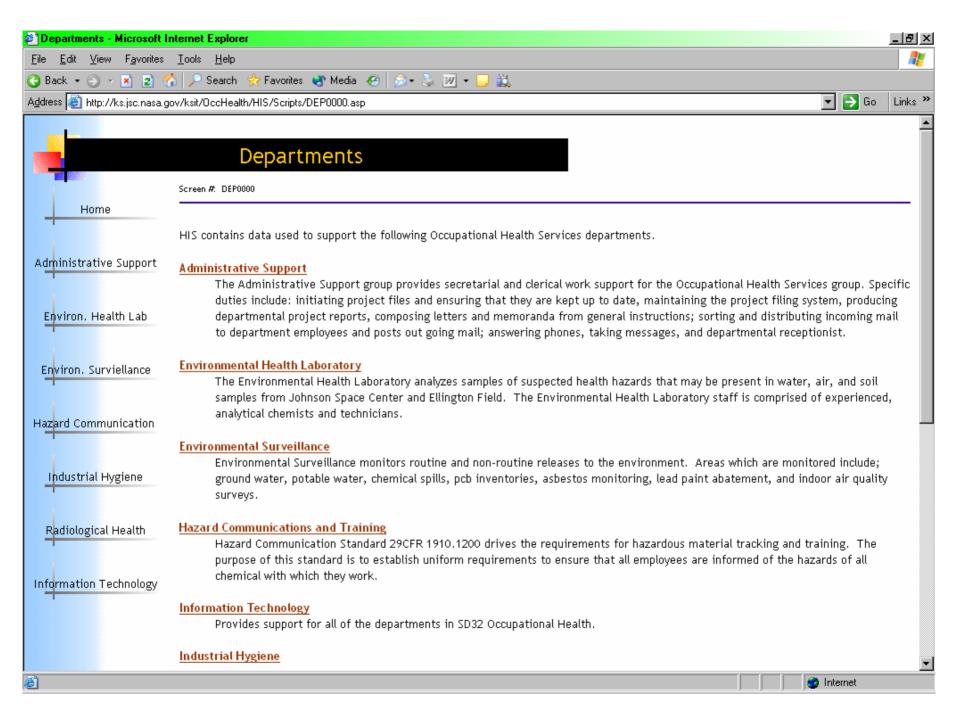


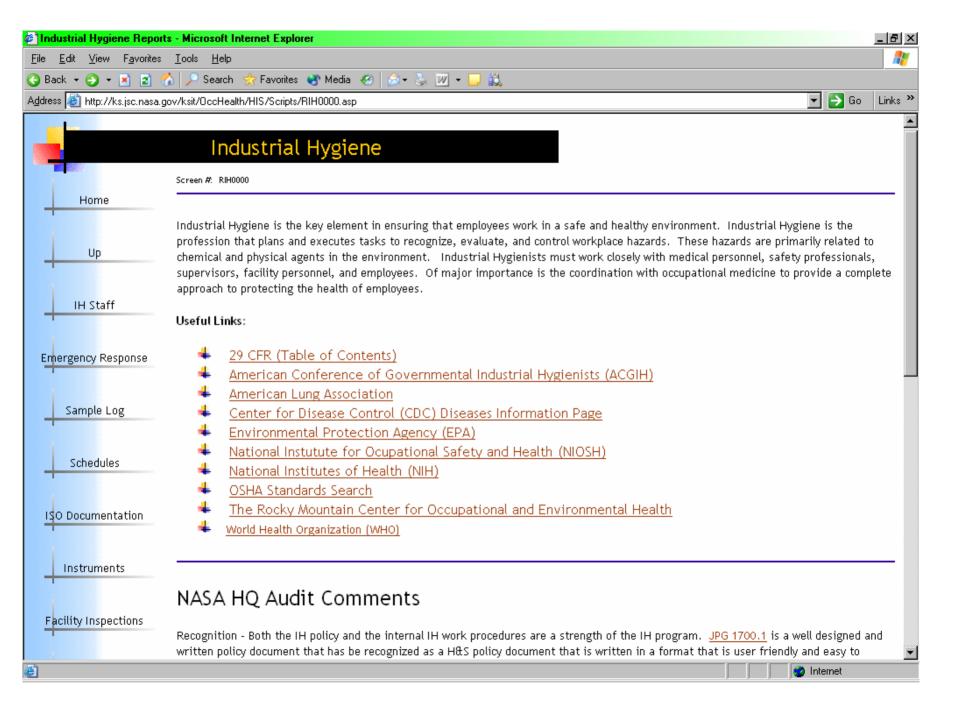


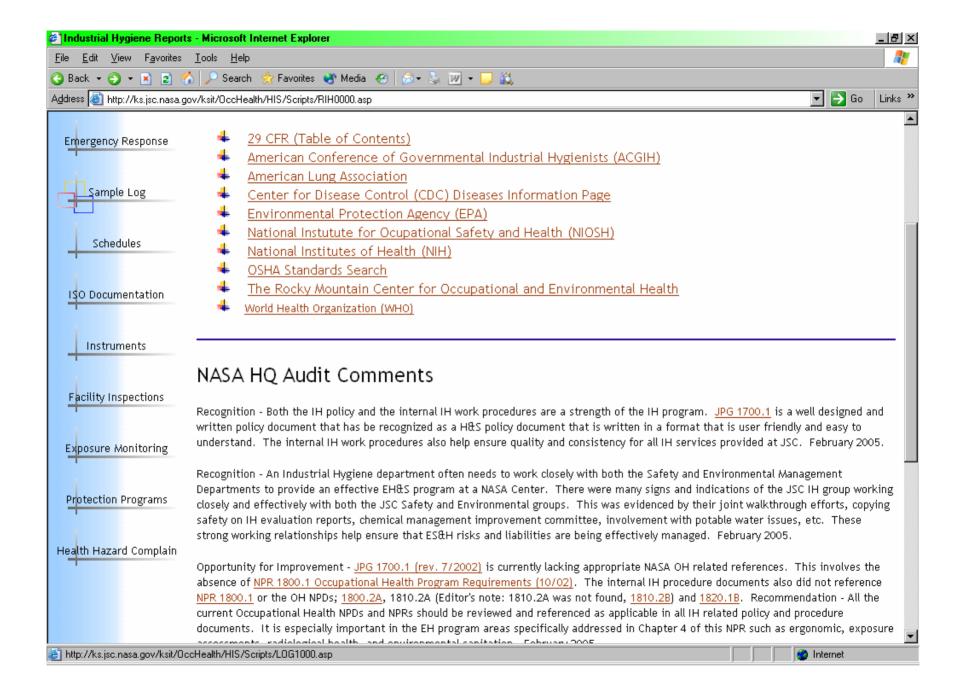
| Room       | Sample Type             | Chain<br># | Prefix | Matrix             |       | Sample<br>Date | Sampler Remarks                      | =/< | Concentration | Hygienist |
|------------|-------------------------|------------|--------|--------------------|-------|----------------|--------------------------------------|-----|---------------|-----------|
| (Building) | Ambient -<br>Background | 819        | IAKRK  | Asbestos<br>Fibers | 16900 | 3/22/1991      | ASBS914343 Background                | =   | 0.002         | BLeech    |
|            | Amhient -               | 819        | IAKRK  | Asbestos<br>Fibers | 16899 | 3/22/1991      | ASBS914342 Background                | =   | 0.002         | BLeech    |
|            | Ambient -<br>Background | 754        | IAKRK  | Asbestos<br>Fibers | 14372 | 4/22/1987      | ASBS870583 Background near breathing | <   | 0.005         | КВ        |
|            | Ambient -<br>Background | 754        | IACRC  | Asbestos<br>Fibers | 14373 | 4/22/1987      | ASBS870584 Background near breathing | <   | 0.005         | КВ        |
| (Building) | Ambient -               | 687        | IΔSRS  | Asbestos<br>Fibers | 10341 | 4/15/2003      | ASBS0310341 Ambients QP-16           | =   | 0.002         | lsteffen  |
| <br>       | Ambient -               |            |        | Asbestos           |       |                |                                      |     |               |           |

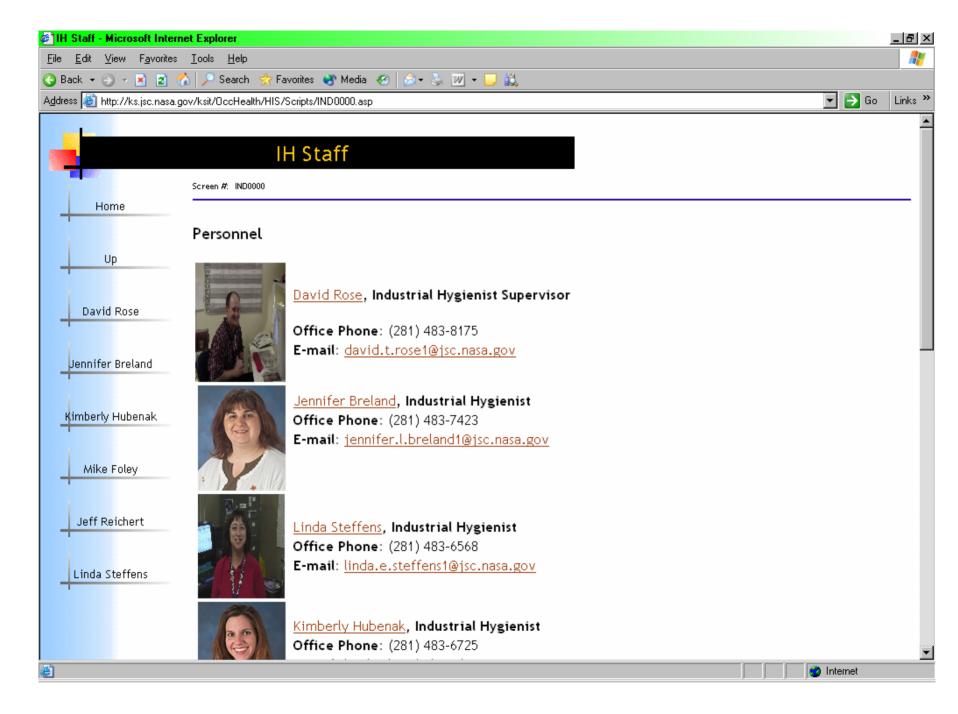
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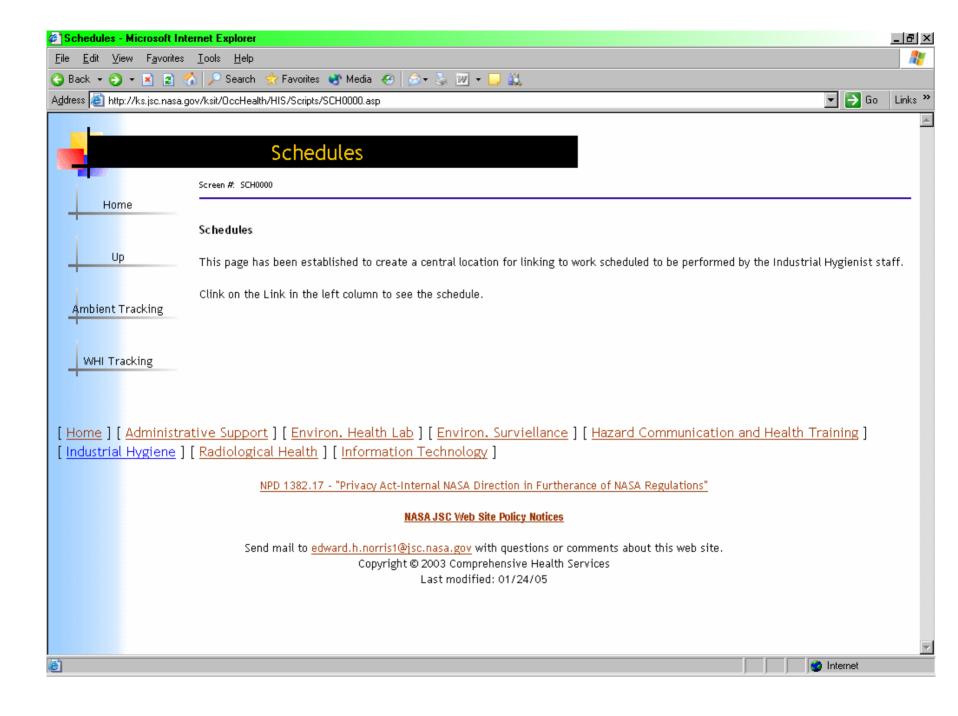


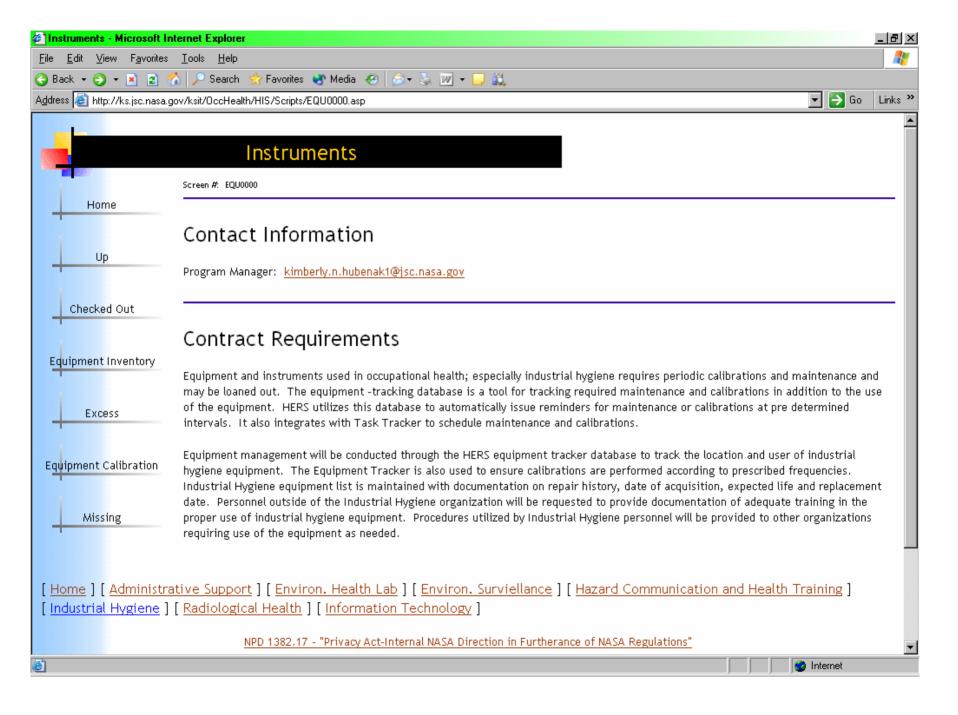


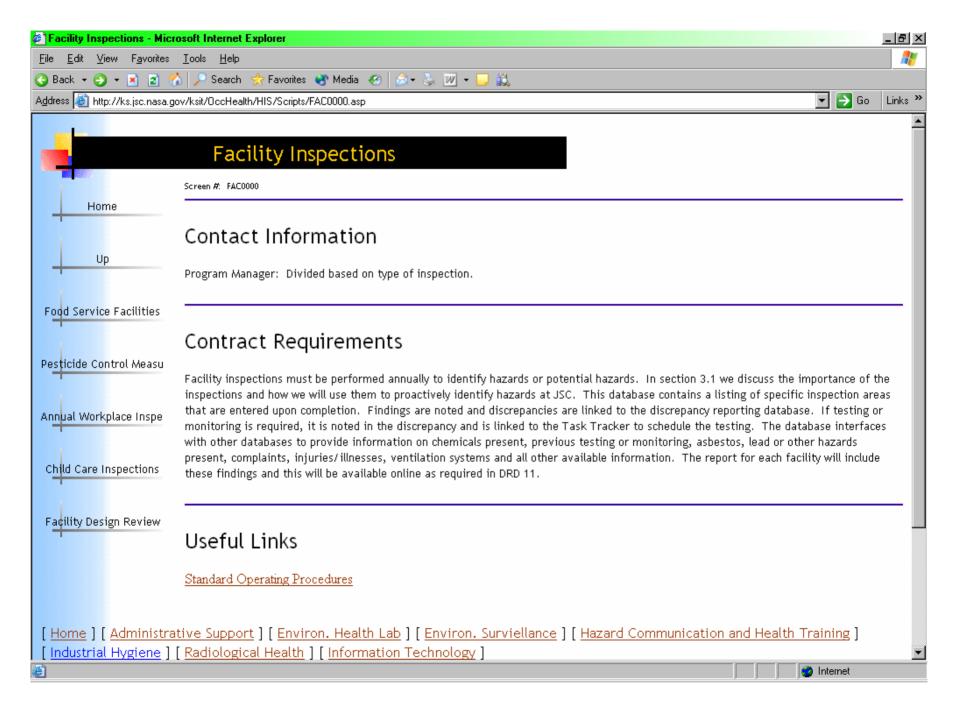


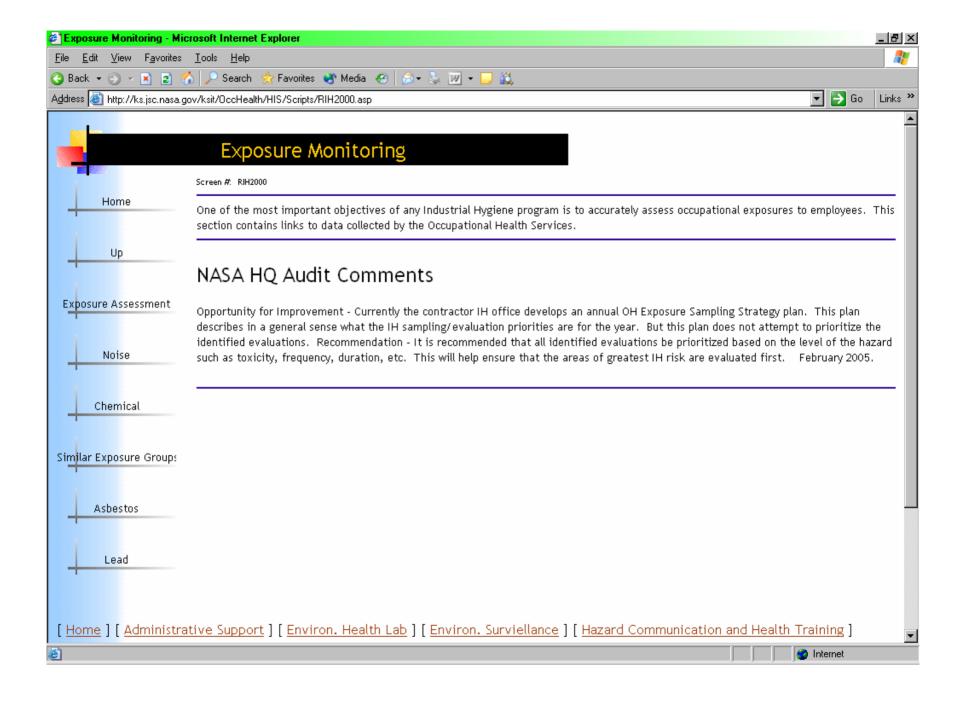


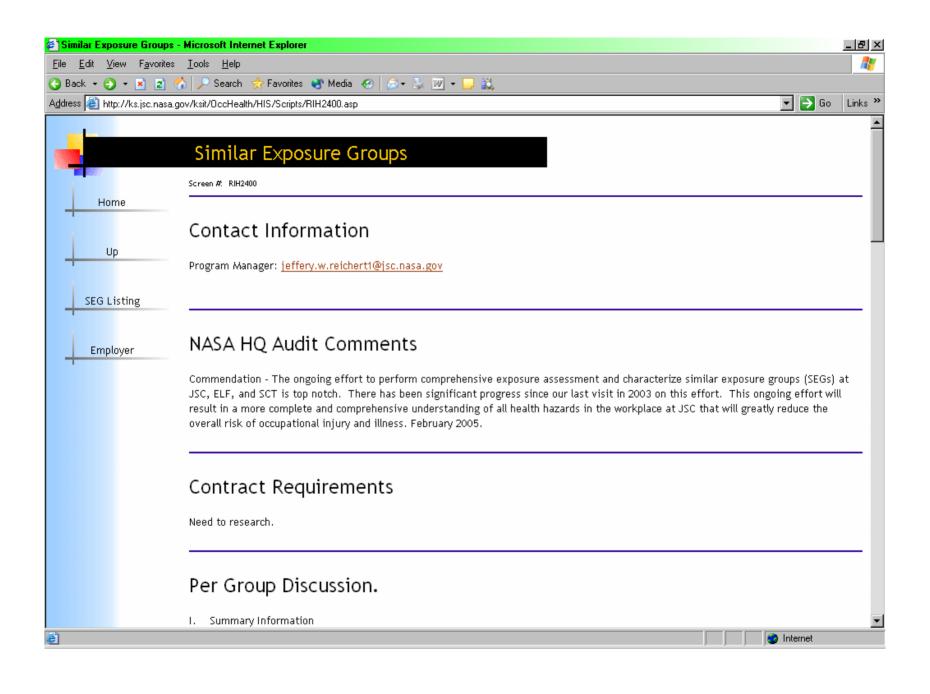


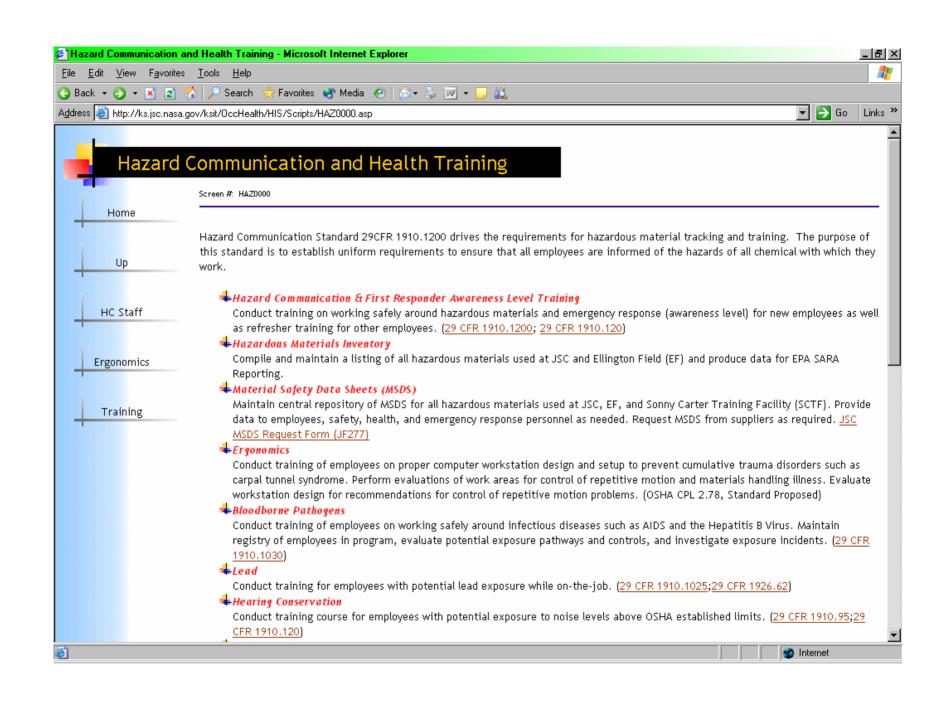


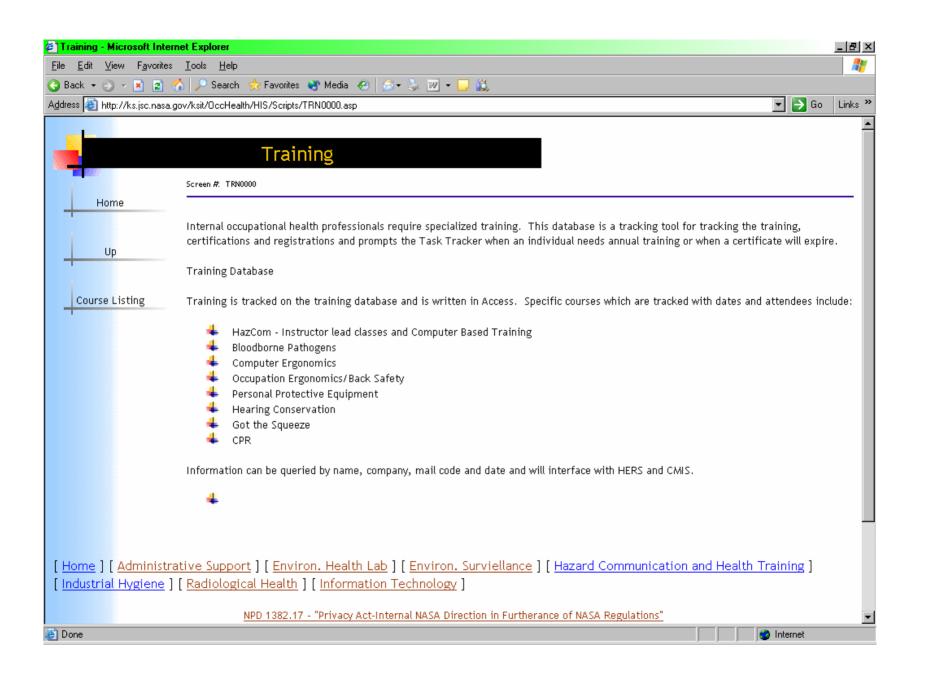












#### Foundation For The Future

- Where Do We Need To Grow?
  - Integration with the EHR (Electronic Health Record) system
  - Improvement of the Industrial Hygiene to Environmental Health Laboratory interfaces
- Development of Future Interfaces
  - Facilities
    - Ability to link to Master tables, Building/Room changes
    - FM's able to view data concerning the buildings they monitor
    - Ability to access reports online
  - Human Resources / Contractors / Personnel
    - Improved communication of personnel changes
  - Material Safety Data Sheets
    - Contains the master data for chemicals used on site
  - Respiratory Protection
    - Ensure that the proper PPEs are being used
  - Training Records
    - Ensure that required training has been completed
  - Ergonomic Evaluations
  - Hearing Conservation Program
  - Safety / JHA's / Similar Exposure Groups
  - Development of Employee Data Center
    - Employees able to access records concerning their exposures